



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/054,352	01/18/2002	Robert Edward Fontana JR.	SJO920000114US1	7113

7590 01/30/2004

Ron Feece  
INTERNATIONAL BUSINESS MACHINES CORPORATION  
Dept. L2PA  
5600 Cottle Road  
San Jose, CA 95193

EXAMINER

KLIMOWICZ, WILLIAM JOSEPH

ART UNIT	PAPER NUMBER
----------	--------------

2652

6

DATE MAILED: 01/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/054,352

Applicant(s)

FONTANA ET AL.

Examiner

William J. Klimowicz

Art Unit

2652

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 December 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) 3-6, 10, 13-15 and 19-33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 7-9, 11, 12 and 16-18 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 January 2002 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

Applicant's election without traverse of Group II (article claims 1-19), Specie I (Figs. 9-20), which Applicants contend to read on article claims 1-9, 11-18 and method claims 20-28, 30 and 31 and Subspecie IA which Applicants contend to read on article claims 1, 2, 7-9, 11, 12 and 16-18, in Paper No. 5 (filed December 1, 2003) is acknowledged.

Claims 3-6, 10, 13-15 and 19-33 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 5.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 7 are rejected under 35 U.S.C. 102(b) as being anticipated by Brug et al. (US 5,930,087).

As per claim 1 (and also as per claim 11, which is rejected under 35 USC 103, *infra*), Brug et al. (US 5,930,087) discloses a magnetic head assembly (10) having an air bearing surface (ABS) (at (50)) comprising: a read head including: first (12) and second (14) ferromagnetic shield layers; a read sensor recessed from the ABS and which includes a ferromagnetic free layer

Art Unit: 2652

(e.g., portion of active region of (30) in direct contact with barrier layer (34)); a ferromagnetic flux guide (e.g., portion of region of (30) in direct contact with opposing end portions of conductor (36) between the narrowest regions between shields (12, 14) and outside of the cavity in which layers (36), active region (30), (34), (32) and (38) are formed) magnetically connected to the read sensor and extending from the read sensor to the ABS (50) for conducting field signals to the read sensor (see in particular, COL. 2, line 60 through COL. 3, line 18); each of the read sensor and the flux guide being located between ferromagnetic first (12) and second (14) shield layers; a distance between the first (12) and second (14) shield layers at the ABS (50) being less than a distance between the first (12) and second (14) shield layers at the read sensor (active region) (see FIG. 1); and a longitudinal biasing stack (LBS) (e.g., (42, 44) magnetically coupled to the free layer (e.g., portion of active region of (30) in direct contact with barrier layer (34)) for biasing a magnetic moment (M1 - FIG. 2) of the free layer (e.g., portion of active region of (30) in direct contact with barrier layer (34)) parallel to the ABS (50) and parallel to major planes of the layers (see FIGS. 1 and 2).

As per claim 7 (and also as per claim 17, which is rejected under 35 USC 103, *infra*), further comprising: the flux guide (e.g., portion of region of (30) in direct contact with opposing end portions of conductor (36) between the narrowest regions between shields (12, 14) and outside of the cavity in which layers (36), active region (30), (34), (32) and (38) are formed) including an extension of the free layer (e.g., portion of active region of (30) in direct contact with barrier layer (34)) which extends from the sensor to the ABS (50) (as is readily seen in FIG. 1); the read sensor further including: a ferromagnetic pinned layer (32) that has a magnetic moment (M2 - FIG. 2); an antiferromagnetic pinning layer (60) (COL. 5, line 17) exchange

Art Unit: 2652

coupled to the pinned layer (32) for pinning the magnetic moment (M2) of the pinned layer (32); and a spacer layer (34) located between the pinned layer (32) and said free layer (e.g., portion of active region of (30) in direct contact with barrier layer (34)); and said pinned layer (32), pinning layer (60) and spacer layer (34) being located only in said read sensor.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 8, 9, 11, 12 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brug et al. (US 5,930,087).

See the description of Brug et al. (US 5,930,087), *supra*.

Additionally, as per claim 16, wherein the spacer layer (34) is a nonmagnetic electrically nonconductive barrier layer (e.g., see COL. 5, lines 9-11).

With regard to claim 17, see the rejection of claim 7, *supra*.

As per claims 2 and 12, Brug et al. (US 5,930,087) further discloses wherein the LBS (42, 44) includes: a hard bias layer (e.g., see COL 4, lines 49-50).

With regard to claims 2 and 12, however, Brug et al. (US 5,930,087) remains silent with respect to a nonmagnetic metal spacer layer being located between and interfacing the free layer and the hard bias layer.

Art Unit: 2652

Official notice is taken that nonmagnetic metal spacer layers located between and interfacing free layers and hard bias layers of GMR sensors of the type disclosed by Brug et al. (US 5,930,087) are notoriously old and well known and ubiquitous in the art; such Officially noticed fact being capable of instant and unquestionable demonstration as being well-known.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide a nonmagnetic metal spacer layer located between and interfacing the free layer and the hard bias layer of Brug et al. (US 5,930,087), as is known in the GMR art.

The rationale is as follows: one of ordinary skill in the art would have been motivated to provide a nonmagnetic metal spacer layer located between and interfacing the free layer and the hard bias layer of Brug et al. (US 5,930,087), as is known in the GMR art in order to minimize diffusion of the materials of the free layer and hard biasing layer into each other, by providing a metallic buffer layer between the materials, as is well known, established and appreciated in the art.

As per claims 8 and 11, Brug et al. (US 5,930,087) does not expressly show: a write head including: ferromagnetic first and second pole piece layers that have a yoke portion located between a pole tip portion and a back gap portion; a nonmagnetic write gap layer located between the pole tip portions of the first and second pole piece layers; an insulation stack with at least one coil layer embedded therein located between the yoke portions of the first and second pole piece layers; and the first and second pole piece layers being connected at their back gap portions, wherein, as per claims 9 and 18, the second shield layer being located between the first shield layer and the second pole piece layer; and the free layer being located between the pinned layer and the second shield layer.

Moreover, Brug et al. (US 5,930,087) further does not expressly show a conventional disk drive including the known structures provided in such a conventional disk drive, including the elements set forth in claim 11: a housing; a magnetic disk rotatably supported in the housing; a support mounted in the housing for supporting the magnetic head assembly with said ABS facing the magnetic disk so that the magnetic head assembly is in a transducing relationship with the magnetic disk; a spindle motor for rotating the magnetic disk; an actuator positioning means connected to the support for moving the magnetic head assembly to multiple positions with respect to said magnetic disk; and a processor connected to the magnetic head assembly, to the spindle motor and to the actuator for exchanging signals with the magnetic head assembly, for controlling movement of the magnetic disk and for controlling the position of the magnetic head assembly.

Official notice is once again taken that such write head structure as set forth in claims 8, 9, 11 and 18 and the conventional disk drive structure as set forth in claim 11, with the relationship as set forth in claims 9 and 18 are utilized in GMR sensors of the type disclosed by Brug et al. (US 5,930,087) and are notoriously old and well known and ubiquitous in the art; such Officially noticed fact being capable of instant and unquestionable demonstration as being well-known.

Typically such GMR read heads/write head combinations as set forth in claims 8, 9, 11 and 18 are known in the art by the art recognized term "piggyback" heads, wherein the write head and read head are formed directly adjacent to one another, in the manner prescribed by claims 8, 9, 11 and 18.

It would have been obvious to one of ordinary skill in the art at the time the invention

Art Unit: 2652

was made to provide a conventional write head as set forth in the manner prescribed by claims 8, 9, 11 and 18 (e.g., a conventional GMR "piggyback" head), as is known and is ubiquitous in the art, to the read sensor head of Brug et al. (US 5,930,087), within a conventional disk drive structure as set forth in claim 11.

The rationale is as follows: one of ordinary skill in the art would have been motivated to provide a conventional write head as set forth in the manner prescribed by claims 8, 9, 11 and 18 (e.g., a conventional GMR "piggyback" head), as is known and is ubiquitous in the art, to the read sensor head of Brug et al. (US 5,930,087), within its intended operating environment, i.e., a conventional disk drive structure as set forth in claim 11, in order to magnetically record information via the write head, in a known piggyback write head/GMR read sensor head configuration as prescribed by claims 8, 9, 11 and 18, while utilizing the advantages of the read head as espoused by Brug et al. (US 5,930,087) (e.g., minimizing the read head thermal spikes, corrosion, etc, by moving the sensor away from the ABS surface, etc. - see Brug et al. (US 5,930,087)) within its intended operating environment, i.e., a conventional disk drive as set forth in claim 11.

### *Conclusion*

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

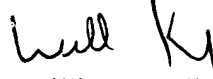
Any inquiry concerning this communication or earlier communications from the examiner should be directed to William J. Klimowicz whose telephone number is (703) 305-3452. The examiner can normally be reached on Monday-Thursday (6:30AM-5:00PM).



Art Unit: 2652

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

  
William J. Klinowicz Primary  
Examiner Art Unit 2652

WJK